

We claim

1. A process for preparing homopolymers of oxiranes, or for preparing copolymers of oxiranes and comonomers, via anionic polymerization in the presence of an alkali metal compound and of an organylaluminum compound, which comprises avoiding any use of crown ethers or of cryptands during the polymerization.
2. A process as claimed in claim 1, wherein the oxiranes have been selected from propylene oxide, ethylene oxide, and mixtures of these.
3. A process as claimed in claim 1 or 2, wherein the comonomers have been selected from styrene, α -methylstyrene, butadiene, isoprene, and mixtures of these.
4. A process as claimed in any of claims 1 to 3, wherein the alkali metal compound has been selected from alcoholates, hydrides, hydroxides, amides, carboxy compounds, aryl compounds, arylalkyl compounds, and alkyl compounds of the alkali metals, and mixtures of these.
5. A process as claimed in any of claims 1 to 4, wherein trialkylaluminum compounds are used as organylaluminum compound.
6. A process as claimed in any of claims 1 to 5, wherein the molar ratio of aluminum to alkali metal is from 1 to 100:1.
7. A process as claimed in any of claims 1 to 6, wherein use is made of from 0.5 to 20 mol% of organylaluminum compound, calculated as aluminum atoms and based on the molar amount of the oxirane.
8. A process as claimed in any of claims 1 to 7, wherein the copolymers are block copolymers, sequential polymerization being used, first polymerizing the comonomer to give a polymer block B and then polymerizing the oxirane to give a polyoxirane block A.
9. A process as claimed in any of claims 1 to 8, wherein, at least during the polymerization of the polyoxirane block A, the molar ratio of aluminum to alkali metal is from 1:1 to 100:1.
10. A homopolymer of oxiranes, or a copolymer of oxiranes and comonomers, or a mixture of these, obtainable by the process as claimed in any of claims 1 to 9.

11. A copolymer as claimed in claim 10 which is a block copolymer.

12. The use of the homopolymers or copolymers as claimed in claim 10 or 11 for producing moldings, foils, fibers, or foams.

5

13. A molding, foil, fiber, or foam composed of the homopolymers or copolymers as claimed in claim 10 or 11.